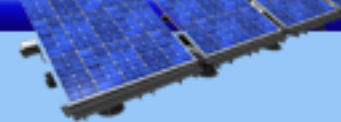


**A Beginner's
Guide to**

**SOLAR
PANELS**





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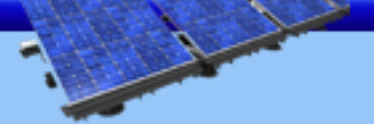
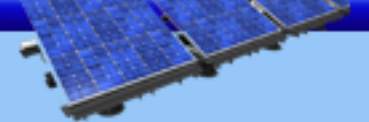


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A Beginner's Guide to Solar Panels

INTRODUCTION

Global warming is a huge problem which will significantly affect every country in the world. Many people all over the world are trying to do whatever they can to help combat the effects of global warming. One of the ways that people can fight global warming is to reduce their dependence on non-renewable energy sources like oil and petroleum based products. There has been a vast increase in the interest of businesses and everyday people in finding ways to live in a more environmentally responsible way and to find alternate fuel sources.

It's not always easy to find ways to be more environmentally responsible and still meet all the obligations of everyday life. For example, many people would like the chance to ride a bike to work everyday or walk instead of having to drive a car but for many of those people that's just not a feasible option.

Taking public transportation is a better alternative than driving to work everyday but that isn't much in your control. Whether or not you can take public transportation really depends on where you live and how much of a public transportation system there is in place in that city. It's not unusual for a large city to have a public transportation system that doesn't function well in reaching its population or a smaller city not to have any public transportation available at all.

So what are some options that are out there for people who want to live in a more environmentally-friendly way but still have to deal with certain day-to-day realities that don't always allow them to make the choices they'd like to make? One of them is using solar energy to help heat and power your home. Solar energy is a completely renewable energy source that will save you money on your heating and electricity costs as well as save environmental resources.

In the past using solar energy was not really something that most people could use at home because the technology was still being developed. In recent years the investment by government and industry into developing solar power technology has made using solar power much more affordable and feasible. Today homeowners and apartment and commercial building developers are able to use solar energy and help the environment while saving money.

Using solar energy as a main power source is still relatively new in the United States but other countries have been relying on solar power for a large amount of their energy needs for years. These countries have proven that with the right equipment and technology it is possible to reduce dependence on fossil fuels and non-renewable energy sources. Because solar energy produces no greenhouse gases, using solar power helps the environment.

WHAT IS RENEWABLE ENERGY?

There is a lot of focus on finding ways to use renewable energy to fill the vast power needs of the world population. What exactly is renewable energy? Renewable energy means harnessing the forces of the wind, the sun, water, geothermal, and other natural occurring forces to create energy that can be used for electricity and heat.

Unlike fossil fuels which are also natural but are only available in limited supply. Renewable energy sources can be used over and over again without depleting them. There are five main sources of renewable energy that humans can use:

1. Bio energy – Bio energy is created from plants or grains that can be replanted and replenished. Ethanol is an example of using bio energy. Ethanol is a fuel that is a hybrid of petroleum and an alcohol-based fuel that is made primarily from corn in most of the United States, although some other countries, like Brazil, make ethanol using sugar cane instead of corn. Ethanol is widely used in other countries and is becoming more popular in the United States.

Many companies and scientific labs are experimenting with different bio fuels to find a bio fuel that works with already existing vehicles to help reduce dependence on petroleum. Hybrid vehicles that run on a combination of petroleum based fuel and bio fuels are becoming more and more popular. Some vehicles that run on diesel fuel are being converted to run on bio-diesel which is a fuel made from used vegetable oil that is discarded by restaurants and food plants.

2. Hydro power – Hydro power is using the power of flowing water to create electricity. Hydro power is one of the oldest continually used forms of creating energy and was extremely popular before it become common to use fossil fuels. For hundreds of years rushing water was used to create energy that would operate a grain mill and grind corn and wheat, power steam engines, and provide energy for other common tasks. The first known use of hydro power to provide electricity was in 1880, and hydro power has been used to generate electricity every since.

Hydro power is still used today. About 7% of the electricity used in the United States each year comes from hydro electric plants. Because it's necessary for a large hydro electric plant to be located directly on a large body of water in order to have enough water to generate the kind of power that is needed to make electricity hydro electric power plants are not widespread. More than half of the many hydro power plants in the United States are located in only three states: Oregon, California, and Washington.

Hydro power is often considered to be the ideal form of renewable energy because it's practically free, it creates no pollutants that harm the environment, and it has almost no waste products of any kind. The drawback is that hydro power can only be located in a small number of areas with the right natural features. Plus, the large dams needed to harness hydro power can dramatically alter the landscape and affect wildlife.

3. Geothermal power - Geothermal power comes from using the natural heat from deep inside the earth. The core of the Earth generates a lot of heat and water that is heated deep within the Earth and released to the surface through hot springs and geysers. Even volcanoes can be used to heat buildings and homes as well to provide electricity.

The most common use of geothermal power is direct heating. Direct geothermal heating consists of piping hot water from below the surface of the Earth directly into buildings or homes to heat the buildings. Iceland gets up to 95% of their heat from geothermal direct heating. The island nation sits on the world's most easily accessible source of heat energy from volcanic magma close to the Earth's surface.

The United States is the biggest user of geothermal energy for electricity in the world but still less than 1% of all the electricity produced in the United States is generated from geothermal energy. There are about 50 geothermal electricity plants in the United States, mostly in California and Nevada. Since the easiest place to access the water heated within the earth is along fault lines and on the edges of tectonic plates it's not surprising that those two states have the most geothermal energy plants. Geothermal energy produces no pollution or greenhouse gases but can be expensive to utilize and can only be used in a small number of areas that have the proper geology.

4. Wind - Wind energy was probably the first type of natural, renewable energy that was used by people to provide power. Wind energy has no pollutants or contaminants and is great for the environment, but sometimes it can be hard to harness enough wind to generate significant energy.

Wind energy is mainly used locally, supplying electricity on and around wind farms. The United States is third on the list of countries that have the most capacity to produce wind energy yet wind energy is not yet widely used in the United States. In the past this was mostly because building the machines, called wind turbines, which are used to harness wind energy, was expensive and consumed a lot of natural resources. Since 2005 there have been some great technological advances that have made it much more cost-effective to build turbines so the use of wind energy is beginning to grow in the United States.

One of the biggest problems of producing enough wind energy to meet the huge electricity demands of the people in the United States is the weather. Since wind can't be grown like the crops that are used for bio energy, and wind is not as constant as the water used to create hydro or geothermal energy there is a limit to how much energy wind can produce. The variability of the wind is also a crucial factor. If there isn't much wind on a particular day there might be very little or no electricity generated that day. Another drawback to wind energy is that a large number of very large wind turbines (they can run up to 25 stories tall) are needed to create a significant amount of energy.

Wind energy is a good source of renewable energy under certain conditions but in the long run wind energy is not going to be the best source of renewable energy for countries to use.

5. Solar energy – Solar energy is collecting and then using the energy generated by the sun for things like electricity and heating. Solar energy is being used more and more by businesses and homeowners as a way to fight rising electricity bills and also to live in a more environmentally friendly way.

One of the first recorded uses of solar energy was in the 1830's when a British explorer in Africa built a box to collect the energy from the sun's rays and used it to cook his food. Today solar energy is used mainly to create heat and to create electricity.

There are two ways to generate electricity from solar energy. The first is using the Photovoltaic method. This method uses a collection of cells made of certain materials to grab the sun's energy and directly convert it to electricity. Since the sun's rays are diffuse it takes a large number of these photovoltaic cells working together to provide any real power.

The second way is using solar power plants. These huge plants use sunlight indirectly to create electricity. In simple terms the sunlight heats water which produces steam and the steam powers a generator that creates electricity. There are 15 large solar power plants in the United States. 10 are in California, and 5 are in Arizona.

Solar energy is totally renewable and has no measurable impact on the environment which is why it's the renewable energy system of choice for many environmentally conscious people. However there are a few drawbacks to using solar energy. One disadvantage of using solar energy is that because the energy created by the sun is so diffuse it takes a lot of sunlight to generate power. This means that solar plants have to have a large surface area.

Another disadvantage of solar energy is that the amount of the sun's energy that reaches the solar cells depends on things like the amount of cloud cover, the temperature, the time of day and other factors that can't be controlled. Scientists are trying to develop ways of using solar energy to generate large amounts of power, similar to central power plants burning fossil fuels today.